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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,472	03/24/2004	Osamu Nakamura	740756-2722	2927

22204 7590 12/11/2006

NIXON PEABODY, LLP
401 9TH STREET, NW
SUITE 900
WASHINGTON, DC 20004-2128

EXAMINER	
DHINGRA, RAKESH KUMAR	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 12/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/807,472	NAKAMURA, OSAMU	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/22/06 has been entered.

Claim Rejections - 35 USC § 112

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention as explained hereunder.

Claim 1 recites "wherein the plasma generation unit is arranged linearly in one line or a plurality of lines, which is indefinite, since this limitation would be relevant only for plasma generating unit with electrodes disposed in plurality of opposed rows. However, line 2 of the claim recites "a plasma generation unit comprising a first electrode and a plurality of second electrodes opposed to first electrode" implying that linear arrangement can only pertain to plurality of second electrodes, not to plasma generation unit. Therefore for the purpose of examination on merits, the limitation has been interpreted as "whereas the plurality of second electrodes of the plasma generation unit are arranged linearly".

Response to Arguments

Applicant's arguments with respect to claim 1-23 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended claims 1-3, 7-9, 16, 17 and 19-21 by adding new limitations and also added new claims 24-30.

New reference (Gianchandani et al – WO/0127969, equivalent to US Patent 6,827,870) has been found that reads on amended claim 1 limitations. Accordingly claim 1 and claims 7, 10, 13, 16 and 19 are rejected under 35 USC 102 (b) as explained below. Further, independent claims 2, 3 and new independent claim 24 have been rejected under 35 USC 103 (a) as explained below.

Remaining dependent claims 4-6, 8, 9, 11, 12, 14, 15, 17, 18, and 20-23 and balance new claims 25-30 have also been rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7, 10, 13, 16 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870).

Regarding Claim 1: Gianchandani et al teach a plasma apparatus (Figures 1-3) comprising:

a plasma generation unit comprising a substrate 17 (as a first electrode) and electrode elements 51, 52 (plurality of second electrodes) opposed to the first electrode 17;

a gas supply unit 13 for introducing a process gas into a space between the first electrode 17 and the plurality of second electrodes (through openings 24 in dielectric layer 22) ; and

a power supply unit 31 for applying a voltage independently (selectively) to at least one electrode among the plurality of second electrodes 51 and 52, wherein

the second electrodes of the plasma generation unit are arranged linearly (column 2, lines 40-65 and column 5, line 25 to column 7, line 35).

Regarding Claim 7: Gianchandani et al teach that voltage can be independently (selectively) applied to various second electrodes 51, 52 (like plurality of plasma generators). Gianchandani et al also teach that electrode segments (plurality of second electrodes 51, 52) may be selectively moved with the help of holder 54 (Figure 3), around substrate area and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35).

Regarding Claim 10: Gianchandani et al teach that plurality of second electrodes are formed using lithography techniques (Figure 5, column 10, lines 15-25).

Regarding Claim 13: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Figure 1).

Regarding Claim 16: Gianchandani et al teach the apparatus is used for etching or deposition (column 2, lines 50-60).

Regarding Claim 19: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter

sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-6, 8, 9, 11, 12, 14, 15, 17, 18, 20-23 and 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870) in view of Morfill et al (US Patent No. 6,777,880).

Regarding Claims 2, 3: Gianchandani et al teach all limitations of the claim (as explained above under claim 1) and further teach plasma apparatus (Figures 1-3) comprising:

a plasma generation unit comprising a substrate 17 (first electrode) and a electrodes 51, 52 (plurality of second electrodes) opposed to the first electrode 17;

a gas supply unit 13 for introducing a process gas into a space between the first electrode 26 and the plurality of second electrodes (openings 24 in dielectric layer 22) ; and

a power supply 31 unit for selectively applying a voltage to at least one electrode among the plurality of second electrodes 51, 52,

wherein the plasma generation unit is arranged linearly (column 2, lines 40-65 and column 5, line 25 to column 7, line 35).

Gianchandani et al further teach (Figure 8) that size and spacing of electrodes may be selected as per type of treatment required like anisotropic etch or isotropic etch etc (column 7, lines 15-30 and column 12, lines 5-30), but does not explicitly teach specific size of second electrode.

Morfill et al teach a plasma apparatus (Figures 1-6) comprising a segment electrode 11 with electrode segments 113 and a second electrode 112. Morfill et al further teach grid size of segmented electrode to be 1.27mm (as against claim size of 1 mm). Morfill et al also teach that size and spacing of electrode segments is application dependent (column 9, lines 10-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select size of second electrodes as taught by Morfill et al in the apparatus of Gianchandani et al as per type of process treatment required.

Regarding Claim 4: Gianchandani et al teach all limitations of the claim except pattern is a wiring pattern, which is an intended use. Since the prior art apparatus meets all structural limitations of the claim, the apparatus is considered capable of meeting this intended use limitation, absent any criticality disclosed.

Regarding Claims 5,6: Gianchandani et al teach a holder 54 that enables movement of second electrodes 51, 52 with respect to substrate 16 (Figure 3 and column 7, lines 1-5).

Regarding Claims 8,9, 25: Gianchandani et al teach that voltage can be independently (selectively) applied to various second electrodes 51, 52 (like plurality of plasma generators). Gianchandani et al also teach that electrode segments (plurality of second electrodes) may be selectively moved around substrate area any of plurality of second electrodes 51, 52 and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35).

Regarding Claims 11,12, 26: Gianchandani et al teach plurality of second electrodes are formed using lithography techniques (Figure 5, column 10, lines 15-25).

Regarding Claims 14,15,27: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Figure 1).

Regarding Claims 17,28: Gianchandani et al teach the apparatus is used for etching or deposition (column 2, lines 50-60).

Regarding Claims 18, 22, 23,30 : Gianchandani et al teach that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr). It would be obvious to select

operating pressure as other process limitations like gases, material to be etched/deposited and voltages etc (column 8, lines 5-15).

Regarding Claims 20,21,29: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35].

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870).

Regarding Claim 24: Gianchandani et al teach all limitations of the claim (as explained above under claim 1) and further including formation of plurality of micro-plasmas 81, 82 (like plurality of plasma generating units) using edges of layers 22, 26, 71 that define opening an opening at substrate 17 surface and where micro-plasma is formed. Gianchandani et al further teach that micro-plasma 82 is also formed adjacent to openings 24 and 27 in the dielectric layer 22 and upper electrode 26 respectively (Figure 6).

Though Gianchandani et al do not explicitly teach plurality of plasma generating units comprising a first electrode and plurality of second electrodes, it would be obvious duplicate the plasma generating units comprising first electrode (substrate 17) and electrode segments 51, 52 (second electrodes) to obtain faster speed of processing and improved through-put.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rakesh Dhingra

Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763